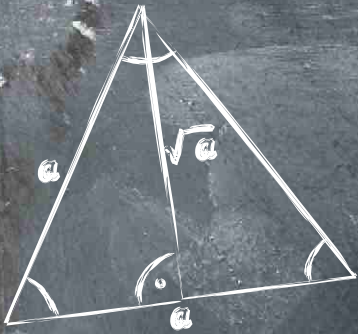


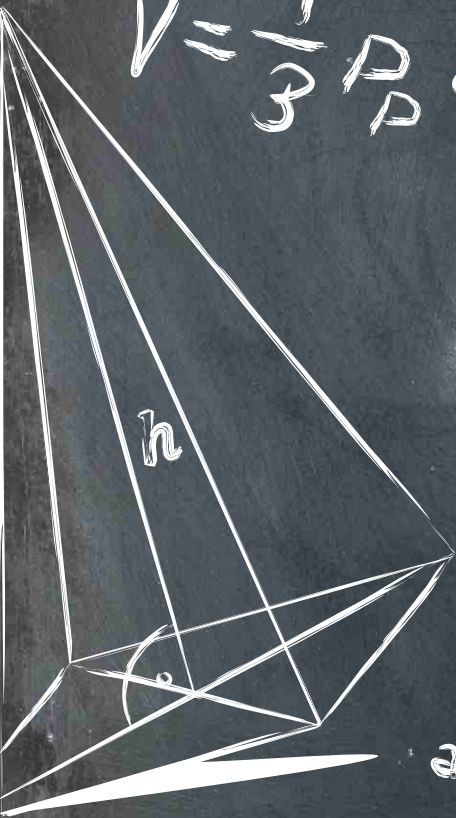
ZESTAW WZORÓW

DO EGZAMINU

GIAMNAZJALNEGO



$$V = \frac{1}{3} P_p \cdot h$$

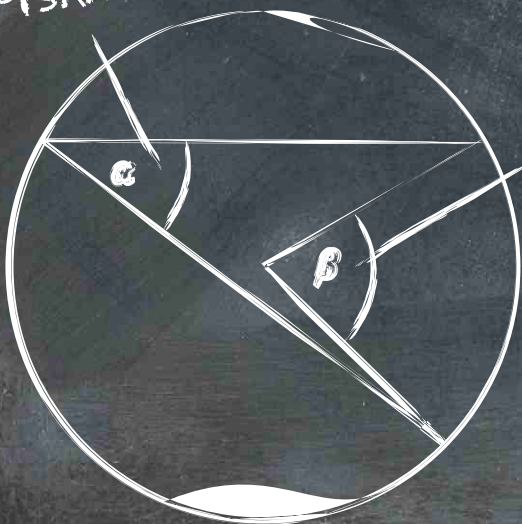


$$\alpha = \gamma$$

$$a = \sqrt{c^2 - b^2}$$

$$b = \sqrt{c^2 - a^2}$$

WPISANY



ŚRODKOWY

$$\frac{\angle AB}{2\pi} = \frac{\alpha}{360^\circ}$$

MEGAMATMA[®]

WYDAWNICTWO MEGAWIEDZA SP. Z O.O.

Wydawca: MegaWiedza sp. z o.o.
e-mail: biuro@megamatma.pl
Redakcja Merytoryczna: dr Alicja Molęda

"Przedruk materiałów opublikowanych w niniejszym e-book chroniony jest prawem autorskim. Bez pisemnej uprzedniej zgody Wydawcy zakazuje się jakichkolwiek publikacji, dalszych przedruków, rozpowszechniania, udostępniania poza wskazanym portalem, publikowania w dowolnej formie fragmentów opracowania. Zakaz ten nie dotyczy cytowania publikacji z powołaniem się na źródło."

MegaMatma.pl® jest serwisem firmy Megawiedza Sp. z o.o., Dobroń 95-082, ul. Zakrzewki 21a, NIP: 731 201 22 93, Regon 100772001, Sąd Rejonowy w Łodzi, XX Wydział Krajowego Rejestru Sądowego, KRS 0000340315, kapitał zakładowy 33.000zł

ISBN 978-83-63410-11-7

ZESTAW WZORÓW DO EGZAMINU GIMNAZJALNEGO

PROCENTY, PROMILE

Ile wynosi p procent liczby a ?

1% liczby 50 wynosi

$$p\% \cdot a = \frac{p}{100} \cdot a$$

$$\frac{1}{100} \cdot 50 = 0,5$$

Ile wynosi p promili liczby a ?

1‰ liczby 50 wynosi

$$p\text{‰} \cdot a = \frac{p}{1000} \cdot a$$

$$\frac{1}{1000} \cdot 50 = 0,05$$

Jaka jest liczba a , której $p\%$ jest równe b ?

0,3% liczby a jest 60, to

$$a = \frac{b \cdot 100}{p}$$

$$a = \frac{60 \cdot 100}{0,3} = 20000$$

Ile procent liczby a stanowi b ?

Ile procent liczby 60 stanowi 20?

$$p\% = \frac{b}{a} \cdot 100\%$$

$$60 - 100\%$$

$$\underline{20 - p\%}$$

$$p\% = \frac{20}{60} \cdot 100\% = 33\frac{1}{3}\%$$

TROCHĘ O POTĘGACH

0^0 nie istnieje!

$$a^n \cdot b^n = (a \cdot b)^n ; \quad a^n : b^n = \left(\frac{a}{b}\right)^n ; \quad a^{-n} = \left(\frac{1}{a}\right)^n$$

$$\left(\frac{1}{2}\right)^{-3} = 2^3$$

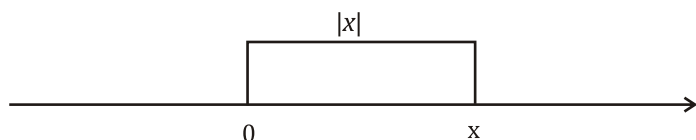
$$(a^n)^m = a^{n \cdot m} ; \quad a^n \cdot a^m = a^{n+m}$$

$$a^n : a^m = a^{n-m}$$

$$10^{-3} \cdot 10^3 = 10^{-3+3} = 1$$

uwaga we wzorach: $a \neq 0$ i $b \neq 0$

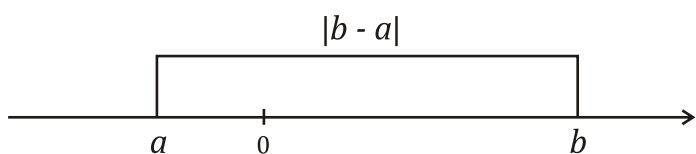
WARTOŚĆ BEZWZGLĘDNA - MODUŁ



$|x|$ to odległość liczby x od zera

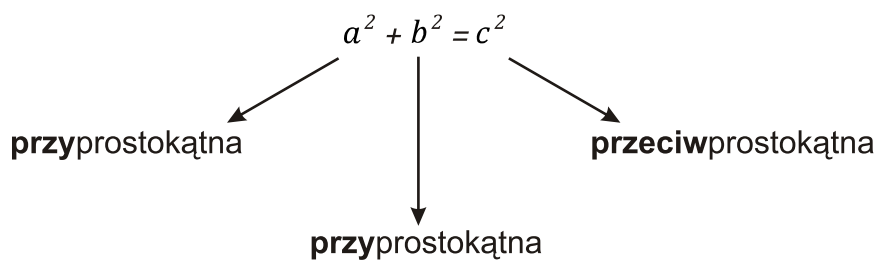
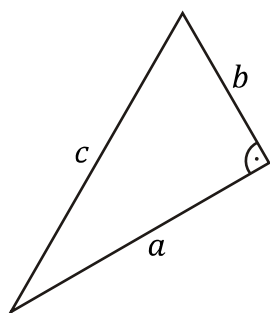
$$|x| = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$$

$$|5| = |-5| = 5$$



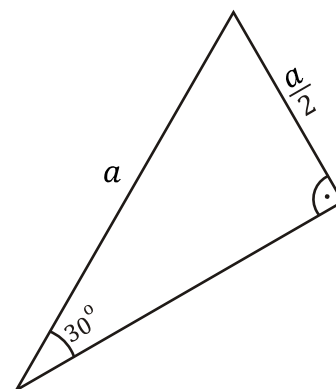
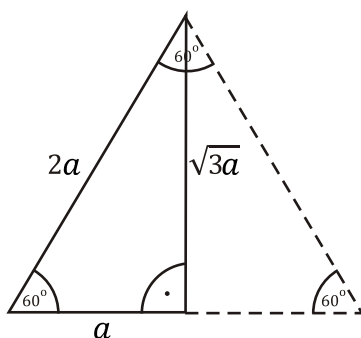
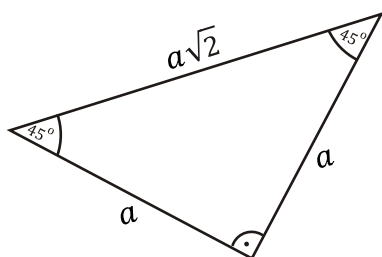
$|b-a|$ to odległość liczb a i b

PITAGORAS

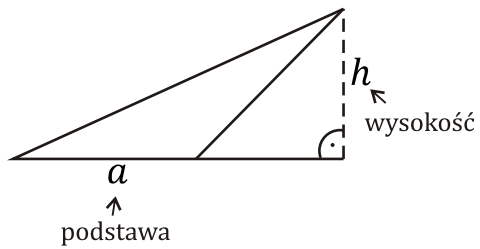


$$a = \sqrt{c^2 - b^2}$$

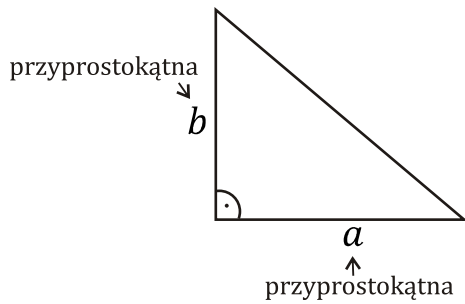
$$b = \sqrt{c^2 - a^2}$$



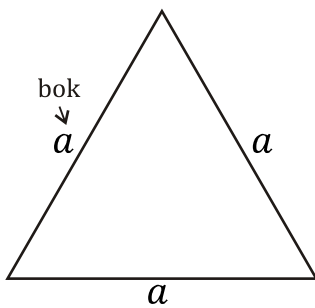
POLE TRÓJKĄTA



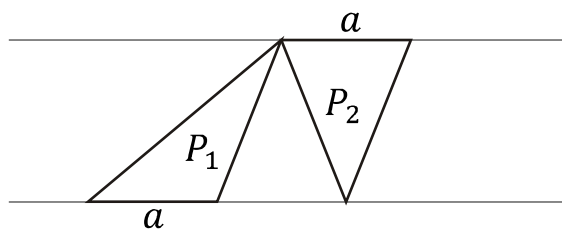
$$P = \frac{1}{2}ah$$



$$P = \frac{1}{2}ab$$

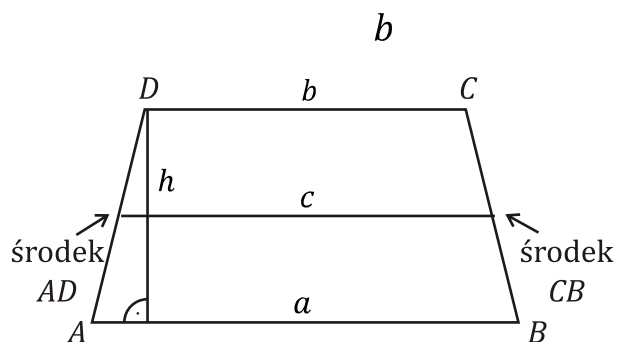


$$P = \frac{a^2\sqrt{3}}{4}$$



$$P_1 = P_2$$

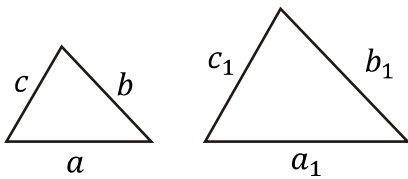
TRAPEZ



$$a \parallel b, \text{ to } c = \frac{a+b}{2}$$

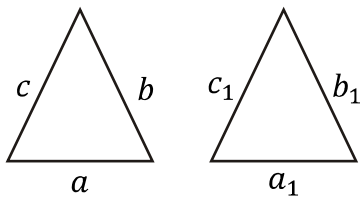
$$P = \frac{a+b}{2} \cdot h$$

TRÓJKĄTY PODOBNE I PRZYSTAJĄCE



Podobne

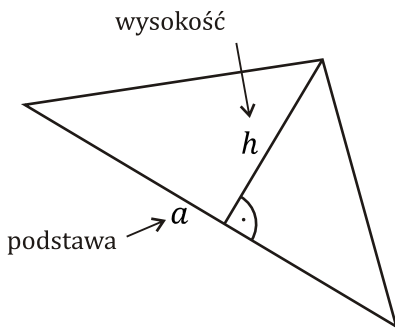
$$\frac{a_1}{a} = \frac{b_1}{b} = \frac{c_1}{c}$$



Przystające

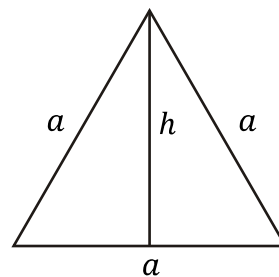
$$a_1 = a \text{ i } b_1 = b \text{ i } c_1 = c$$

WYSOKOŚĆ TRÓJKĄTA



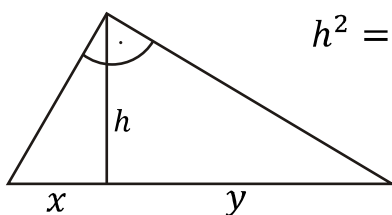
$$h = \frac{2 \cdot P}{a}$$

P - pole

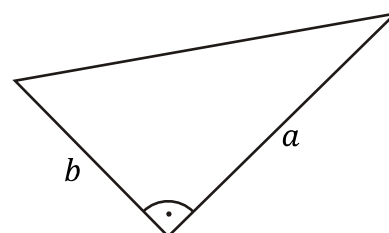


$$h = \frac{a\sqrt{3}}{2}$$

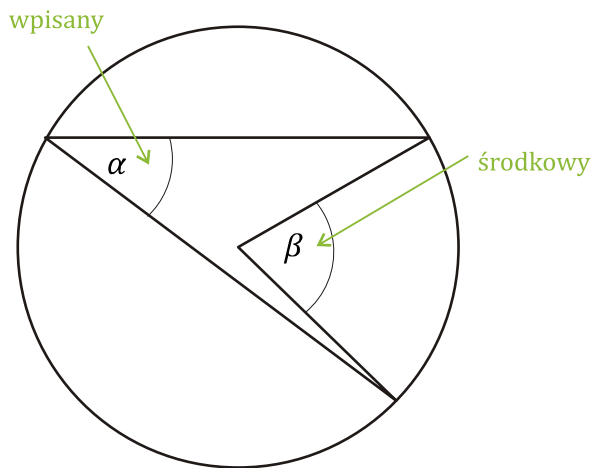
$$h = a \text{ lub } h = b$$



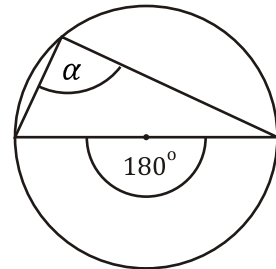
$$h^2 = x \cdot y$$



KĄT ŚRODKOWY I KĄT WPISANY

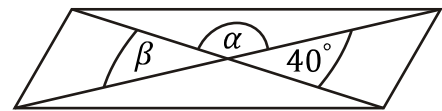
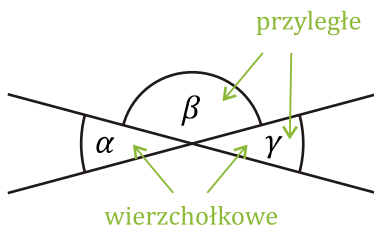


$$\beta = 2\alpha$$



$$\alpha = \frac{1}{2} \cdot 180^\circ = 90^\circ$$

KĄTY PRZYŁĘGŁE I WIERZCHOŁKOWE



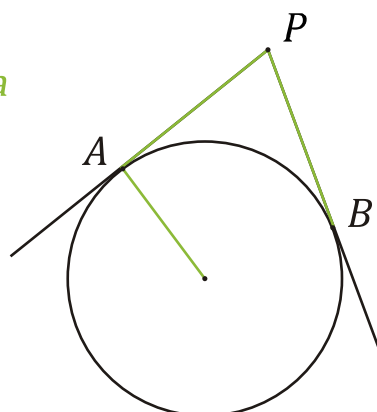
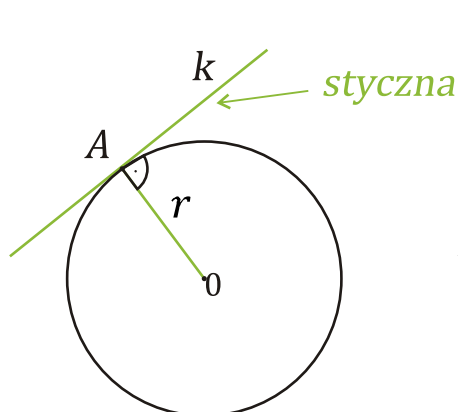
Wierzchołkowe $\alpha = \gamma$

Przyległe $\alpha + \beta = 180^\circ$

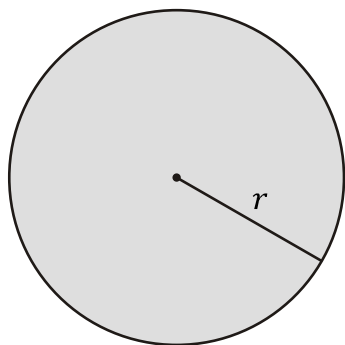
$$\beta = 40^\circ$$

$$\alpha = 180^\circ - 40^\circ = 140^\circ$$

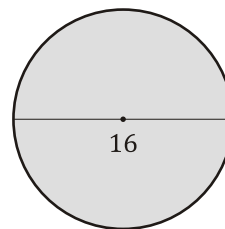
STYCZNA



POLE KOŁA

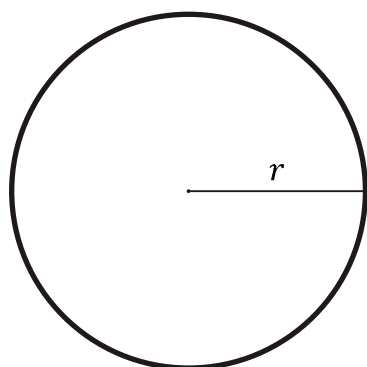


$$P = \pi r^2$$

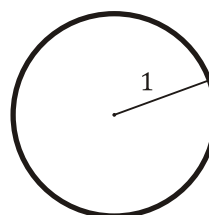


$$2r = 16 \quad r = 8 \quad P = 64\pi$$

DŁUGOŚĆ OKRĘGU



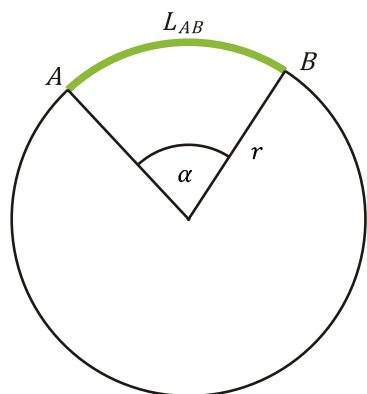
$$L = 2\pi r$$



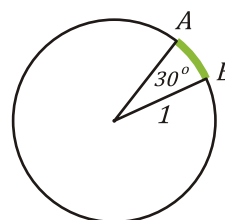
$$L = 2\pi \approx 6,28$$

L - długość okręgu, obwód koła

DŁUGOŚĆ ŁUKU OKRĘGU

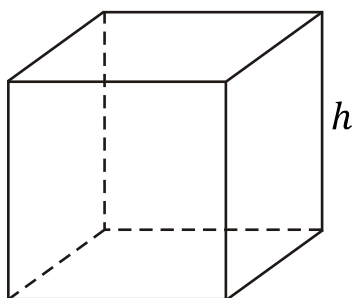


$$\frac{L_{AB}}{2\pi r} = \frac{\alpha}{360^\circ}$$



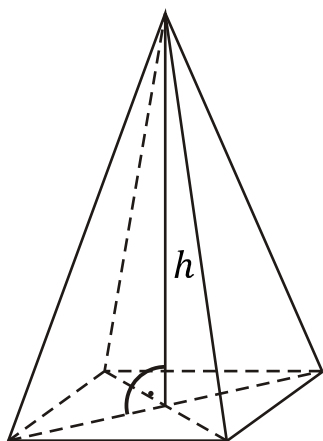
$$L_{AB} = \frac{30^\circ \cdot 2\pi}{360^\circ} \approx 0,52$$

OBJETOŚĆ BRYŁ (GRANIASTOŚŁUP, OSTROŚŁUP)



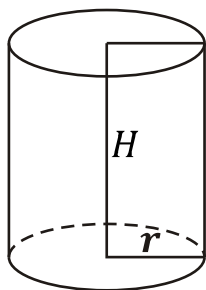
$$V = P_p \cdot h$$

P_p - pole podstawy

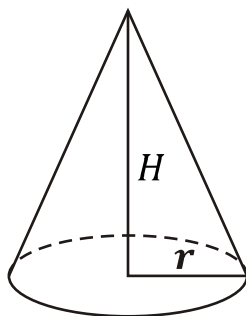


$$V = \frac{1}{3} P_p \cdot h$$

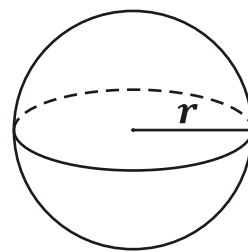
BRYŁY OBROTOWE (WALEC, STOŻEK, KULA)



$$V = \pi \cdot r^2 \cdot H$$

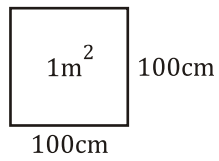


$$V = \frac{1}{3} \cdot \pi \cdot r^2 \cdot H$$

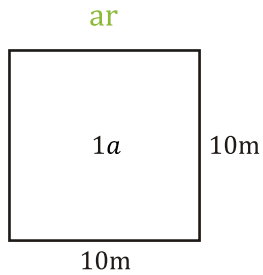


$$V = \frac{4}{3} \cdot \pi \cdot r^3$$

JEDNOSTKI POLA

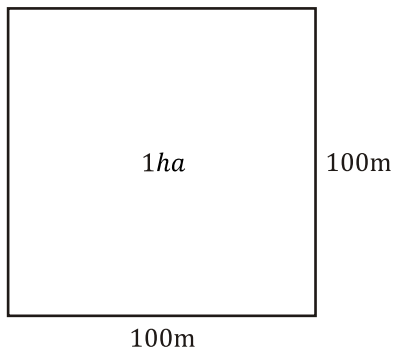


$$1m^2 = 10000cm^2$$



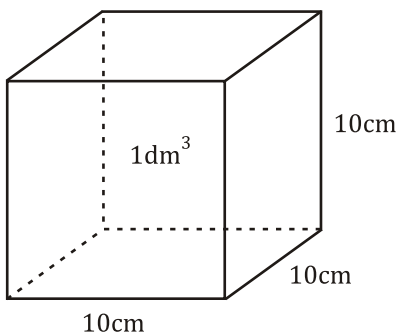
$$1a = 100m^2$$

hektar



$$1ha = 100a$$

JEDNOSTKI OBJĘTOŚCI I POJEMNOŚCI



$$1dm^3 = 1000cm^3$$

$$1m^3 = 1000000cm^3$$

litr → 1l = 1dm³

hektolitr → 1hl = 100dm³

mililitr → 1ml = 0,001dm³

ŚREDNIA

Dane: x_1, x_2, \dots, x_n

2, 7, 13, 1

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n}$$

$$\bar{x} = \frac{2 + 7 + 13 + 1}{4} = 5,75$$

MEDIANA

Zestaw danych zawsze uporządkowany

n – nieparzyste

$$\underbrace{x_1, \dots, x_{k-1}}_{k-1 \text{ danych}}, \underbrace{x_k, \dots, x_n}_{k-1 \text{ danych}}$$

$$M_e = x_k$$

$$\underbrace{1, 2, 3\frac{1}{2}}_{3 \text{ dane}}, \underbrace{16, 18, 20, 50}_{3 \text{ dane}}$$

$$M_e = 16$$

n – parzyste

$$\underbrace{x_1, \dots, x_{k-1}}_{k-1 \text{ danych}}, \underbrace{x_k, x_{k+1}, \dots, x_n}_{k-1 \text{ danych}}$$

$$M_e = \frac{x_k + x_{k+1}}{2}$$

$$\underbrace{1, 2, 3\frac{1}{2}}_{3 \text{ dane}}, \underbrace{16, 18, 20, 50, 51}_{3 \text{ dane}}$$

$$M_e = \frac{16 + 18}{2} = 17$$



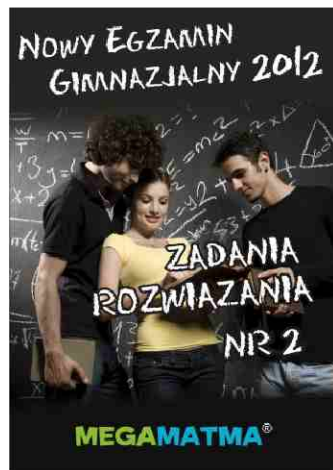
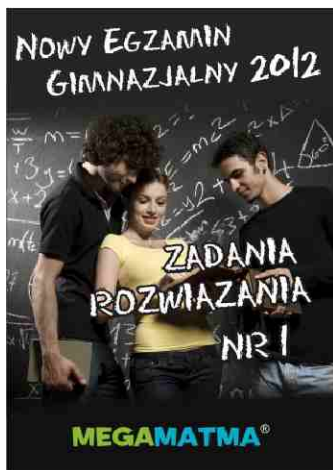
MEGAMATMA®



MEGAMATMA®



MEGAMATMA®



DOSTĘPNE RÓWNIEŻ